Roadmapping America's Measurement Needs for a Stronger Innovation Infrastructure

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Outline

- What and Why

- How

- When
  - Updates

- Discussion

What and Why

Innovation in the news …

"Innovation will be the single most important factor in determining America's success through the 21st century."

<div align="right">

Report of the "National Innovation Initiative"
Council on Competitiveness
December 2004

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"We conclude that although the United States still leads the world in research and discovery, our advantage is eroding rapidly as other countries commit significant resources to enhance their own innovative capabilities."

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Task Force on the Future of American Innovation
February 2005

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Innovation in the news …

"… we live in a competitive world ... We shouldn't take our preeminence as the world's greatest economy for granted. We've constantly got to make sure the economic environment here is strong. We've got to make sure that we're innovative."

President G.W. Bush
April 2004

Why measurements?

- Measurements are crucial to innovation

  – If you can't measure it or measure it better, often you can't make it, you can't control it, you can't improve it

  – If you can measure it better, you can understand it better; if you can understand it better; you can build better instruments; if you can build better instruments, you can measure it better $\Rightarrow$ technological progress

- The U.S. Measurement System (USMS) is

  – An essential component of the national innovation infrastructure

  – A critical element of the strategic environment in which we all operate

What do we need to do?

- Improve our collective ability to

  - Identify current and future measurement needs

  - Marshal the resources needed to address the highest-priority needs in a timely manner

    - Both as individual organizations and together as part of the U.S. Measurement System (USMS) as a whole

What is the desired end state?

- A strong private-public partnership that strengthens the U.S. infrastructure for innovation by

    – Roadmapping America's priority measurement needs on a regular basis

    – Reporting to customers and stakeholders on the state of the USMS

What means roadmapping?

- Identifying the crucial measurement needs of USMS customers and stakeholders – *the assessment*

  - Current and future needs of the entire U.S. economy

    - Private and public sectors

  - All measurement needs, not just those best addressed by NIST

    - New or improved measurement capabilities

    - New or improved measurement-related services and support

    - Needed changes in the structure or operation of the USMS itself

- Motivating an effective response from USMS solution providers – *the plan*

- Delineating the most important gaps and the consequences of not addressing those gaps – *the outstanding issues*
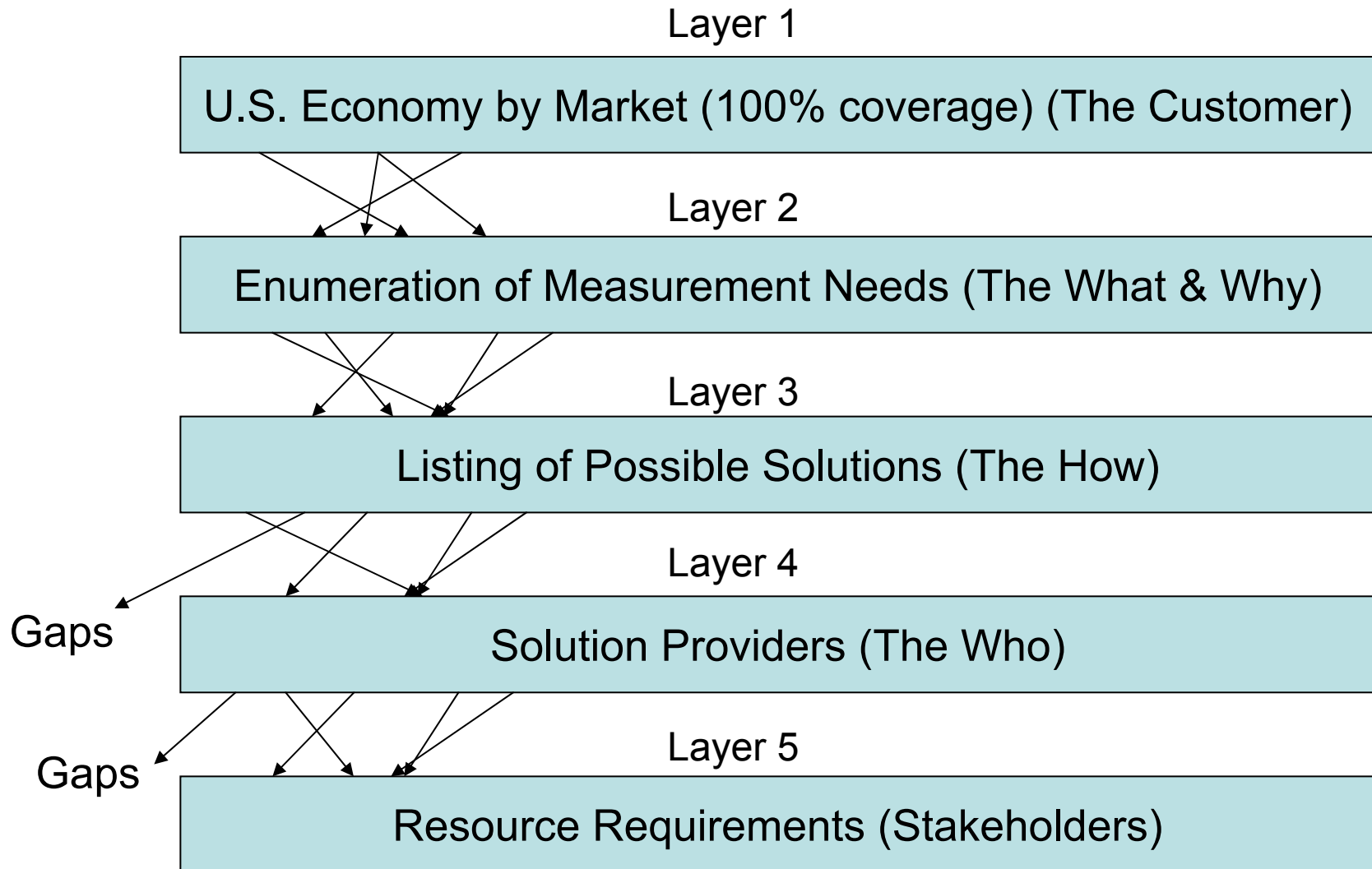
USMS Roadmap

I.   Executive Summary

II.   Why Measurements Are Important

III.   Roadmapping Process

IV.   Needs Assessment

- Organized by sector, with a section on cross-cutting needs

V.   Plan for Responding

VI.   Outstanding Issues

What haven't we done before?

- Identified in a systematic way the long-term measurement needs of the entire U.S. economy

- Included all needs, regardless of how or by whom they could best be addressed

- Developed plans at the system level to address the most important needs
  - Including NIST plans

- Quantified the consequences of not acting

- Reported regularly to customers and stakeholders on the state of the USMS

How

Conceptual Model

Layer 1

U.S. Economy by Market (100% coverage) (The Customer)

Layer 2

Enumeration of Measurement Needs (The What & Why)

Layer 3

Listing of Possible Solutions (The How)

Layer 4

Gaps

Solution Providers (The Who)

Gaps

Layer 5

Resource Requirements (Stakeholders)

USMS Measurement Needs Database

- Under development, based on conceptual model
  - Will be iterative process
    - Three versions between now and spring 2006
  - Will be ongoing enterprise
    - Eventual one-stop shopping for needs

- Will allow multiple taxonomies in different layers

- Will include both met and un-met needs

- Will provide basis for assessment of the USMS

Sources of Input

- Analysis of existing roadmaps and workshop reports
  - NIST Industry and Technology Roadmaps and Workshop Reports Database, currently containing 300 documents

- USMS events
  - Topical USMS workshops
    - First round of NIST-sponsored USMS workshops
  - Meetings with a higher-level focus
    - USMS Summit, pre- and post-Summit meetings
  - Could be organized by NIST or others

- Targeted external outreach

- Economic studies

Aspects of Assessment

- Map needs into Measurement Needs Database

- Create associations *within* layers

- Identify gaps

- View by sector

- View across sectors

- View by type of measurement need

- View by value proposition

- View by estimated importance/impact

- View by type of solution

- View by type of solution provider

- Etc.

What's in it for me?

- If you're a customer of the USMS:
  - If your needs are in the USMS Measurement Needs Database, they will more likely be met
  - You will have a better understanding of possible measurement solutions

- If you're a solution provider:
  - If your solutions are in the USMS Measurement Needs Database, they will more likely be used
  - You will have a better understanding of customer needs

- Approach based on roadmapping the needs of the entire USMS puts the importance of measurements in larger strategic context

When

Timetable

Begin internal and external engagement	February 2005
Public launch	April 2005
Collect and analyze customer and stakeholder information	Ongoing
Convene USMS summit	January 2006
Release assessment of USMS needs	July 2006
Develop plans to address critical needs	October 2006
Publish USMS roadmap	December 2006
Report to the Nation on the state of the USMS	January 2007
Monitor and report on progress	Ongoing
Update roadmap	Ongoing
Repeat overall process	Every 4 years

Updates

- Internal Engagement

- Public Launch

- External Engagement

- USMS Workshops

- Selected Near-Term Priorities

Internal Engagement

- Regular reports to NIST senior management

- Regular all-staff meetings
  - February, April, June

- Regular email and other updates
  - All staff, Division Chiefs and above

- Roadmaps and workshop-reports database

- USMS workshops
  - Program committees, workshop reviews

- Internal USMS website

Public Launch

- Meeting with key customers and stakeholders, Department of Commerce, April 14, 2005

- Testimony by Acting NIST Director Hratch Semerjian, House Subcommittee on Environment, Technology, and Standards, May 11, 2005

- External USMS website: www.nist.gov/usms

External Engagement

- Raising external awareness

  - Presentations at meetings and conferences

  - News releases and other publicity

  - External USMS website

- Targeted external outreach

  - Engagement of key outside organizations
    - Invitations, visits
  - Special events
  - Integration with other NIST efforts

- USMS workshops

USMS Workshops

- Anyone can organize at any time
  - Will take place on an ongoing basis

- Results will feed into the USMS Measurement Needs Database, and hence into USMS assessment

- NIST is jump starting the process with an initial set of 11 workshops over the next 6-9 months

Initial Set of NIST Workshops

- Biophotonic Tools for Cell and Tissue Diagnostics

- Flexible, Large-Area Electronics and Photonics

- Improved Antibody-Based Metrology

- Measurement Challenges in Proteomics

- Medical Imaging Metrology in Telemedicine

- *Metrology and Monitoring Technologies for the National Physical Infrastructure*

- Metrology for the Magnetic Data Storage Industry

- Metrology Needs for Micro/Nano System Technologies

- Metrology Supporting Broadband Telecommunications Access and Transport

- Nano-Biotechnology

- Ultraviolet Radiation Metrology

Selected Near-Term Priorities

- Engaging the new NIST Director

- Messaging

- Targeted external outreach

- Staffing and resources

Acknowledgements

- NIST management and staff

- Advanced Technology Program

- Technology Services
  - Information Services Division
  - Information Systems Group

- Office of the Chief of Staff
  - Public and Business Affairs

- USMS team

- Many others

Discussion